

Encoder Automation Table

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Engineering Release Review - February 27, 2020

Encoders in Action



Printing



Equipment



Food & Beverage

Encoder Types



Programmable Encoders



Linear Encoders

Value Proposition

- Showcase functionality of EPC's products
- Attract individuals at tradeshow
- Inform the public
- Train new employees
- Increase income and efficiency

Project Objective

- Design and create an attractive, interactive display that educates individuals on EPC's lineup of products.
- Demonstrate the programmable encoder's functionality.
- Demonstrate the linear encoder's functionality.
- Demonstrate an industry application (“cut to length”)

Product Requirements + Constraints

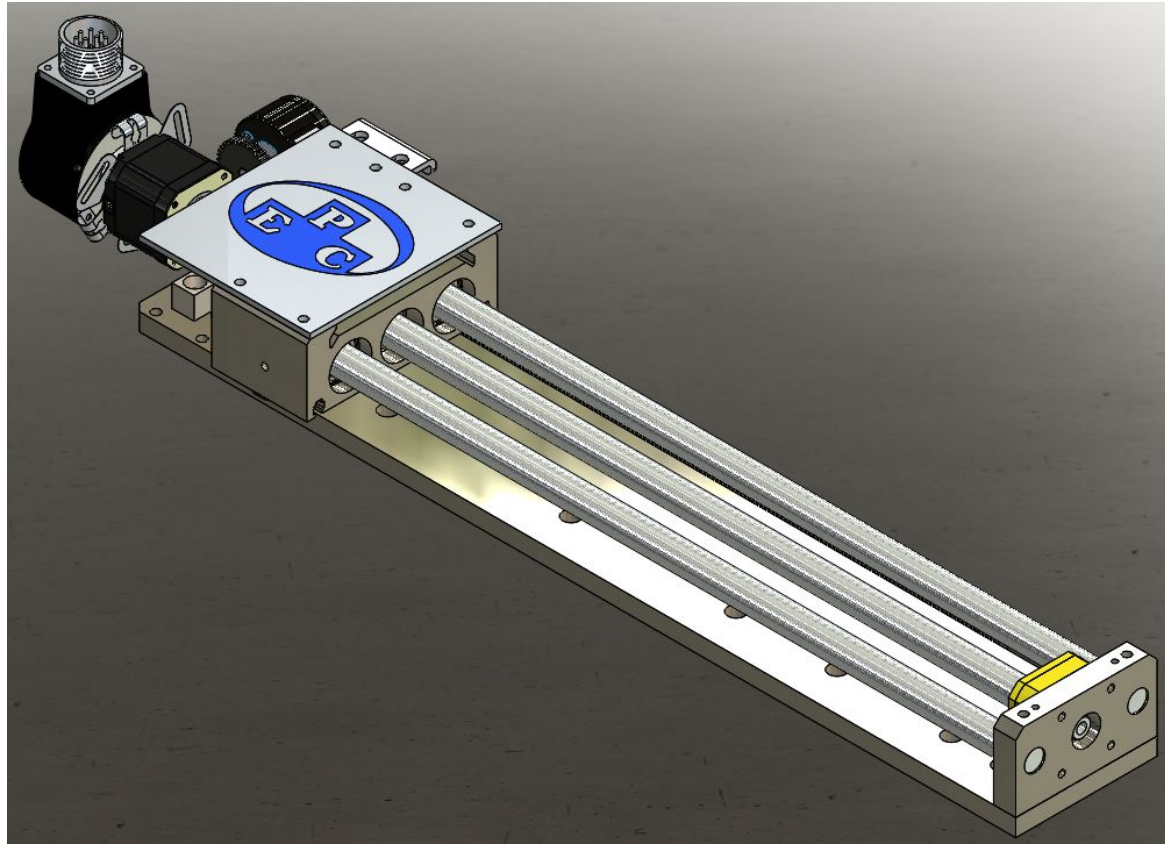
<i>General Description</i>	<i>Measure</i>	<i>Target</i>
HMI Integration	visualize variables, supply inputs, back end programming	motion control works as designed, user interface is self evident for people to use.
Operation time	staff	8 hours per day, enough to run continuously for the duration of a fair
Easy set-up	Set up time and staff	Less than 15 minutes for 2 people to set up
Engages audience	Attractive, interesting, user friendly	Finished (painted/anodized, no wires showing), logos applied

Current Progress

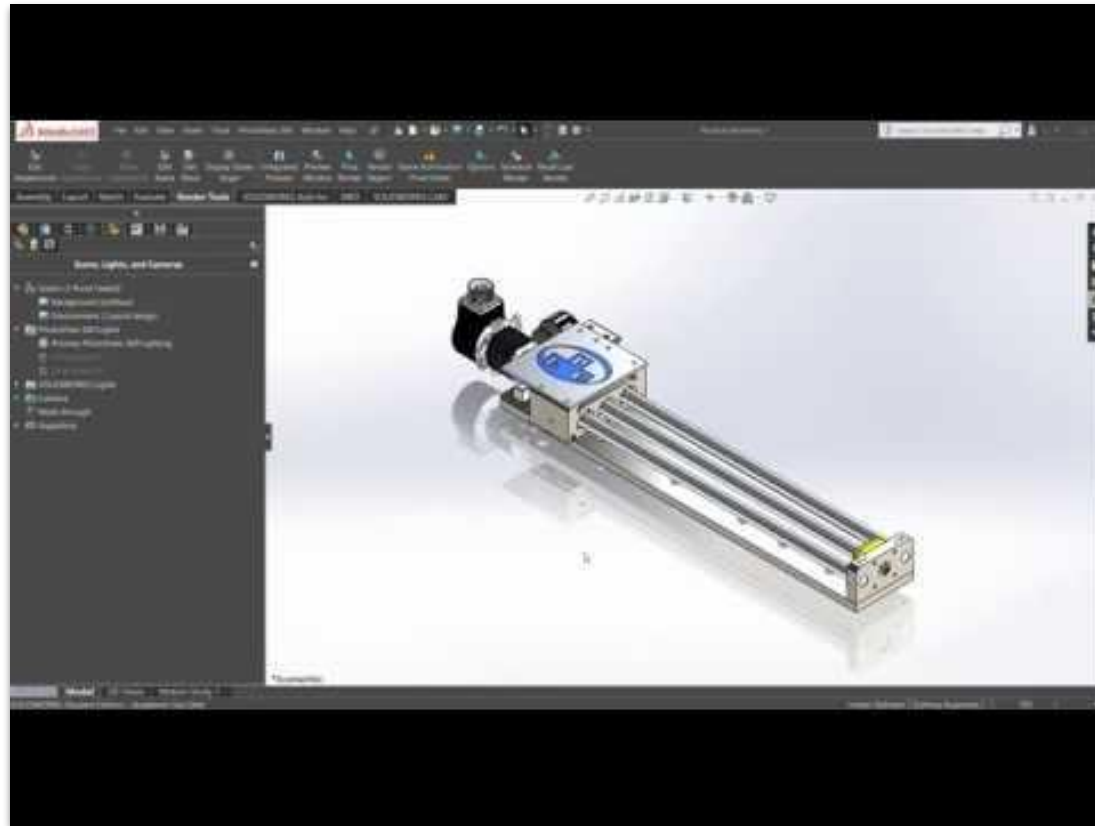
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User Experience

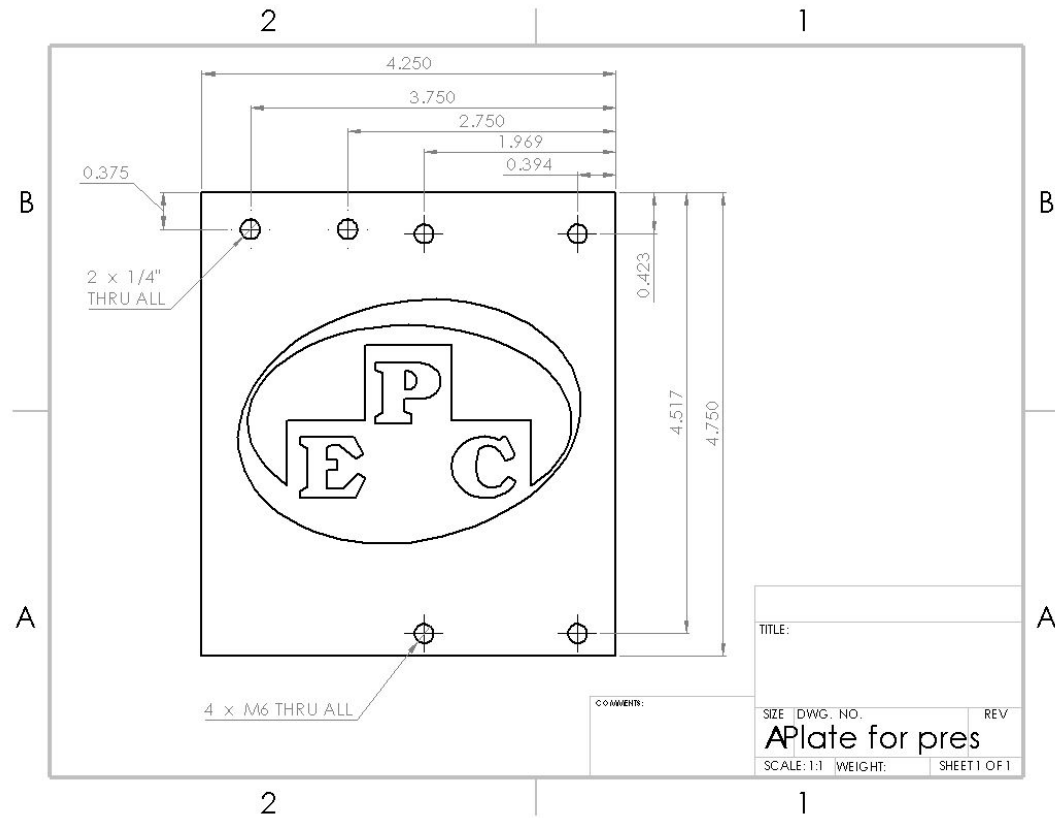
1. User engages in either Citizen or Engineer mode, within the HMI.
2. User attempts to actuate the block to a specified distance.
 - a. Success/failure is determined based on the degree of accuracy.
 - b. In citizen mode, the options for the programmable encoder will be pre-determined.
 - c. In “Engineer mode” the user will get to manually change the resolution of the programmable encoder in order to achieve the goal.
3. Upon failure, the block returns home and the user may try again.
4. Upon success, the user will experience a “random success routine”
 - a. Candy dispensed
 - b. Flashing lights
 - c. Music or sound is played



Physical Apparatus - Linear Actuator



Design Animation



Custom Plate Fabrication

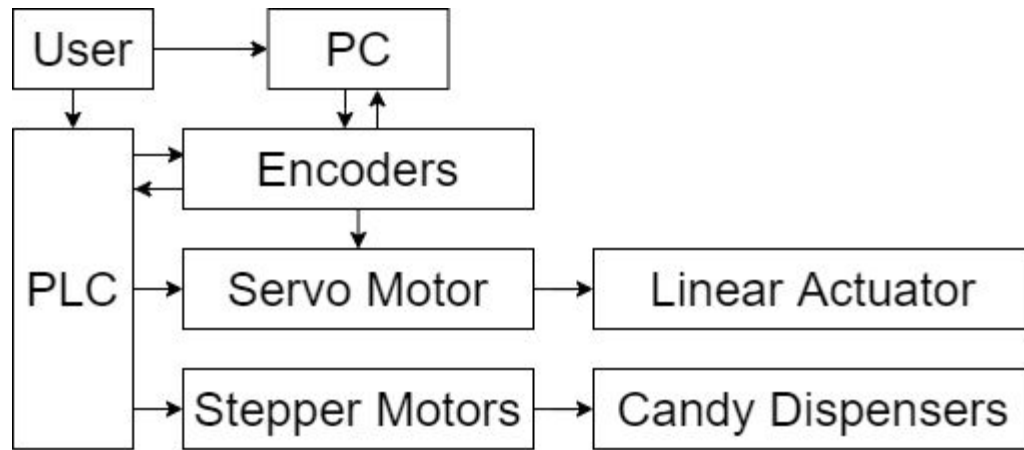


Citizen

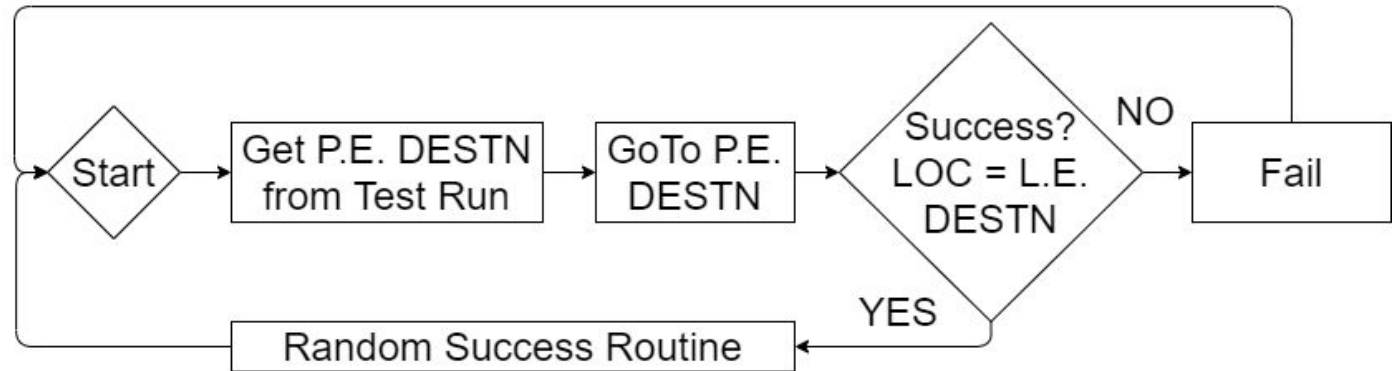
Engineer

Mock PLC User Interface

Block Diagram



Logic Diagram



P.E.: Programmable Encoder
L.E.: Linear Encoder

DESTN: Destination
LOC: Location

Test	Target Date	Completed	Performance	Result	Record
Can the PLC read the Programmable encoder?	2/10/20	1/28/20	The PLC can read the encoder	P	
Can the PLC read the Linear encoder?	02/10/20	1/28/20	The PLC can read the encoder	P	
Can the PLC run the stepper motor?		01/28/20	The PLC can run the stepper.	P	
Can the PLC rotate the stepper motor a given number of rotations?	02/10/20	2/19/20	it can run a given number of rotations	P	
Can the PLC run the servo motor?	02/14/20	2/23/20	the PLC runs the stepper	P	
Can the PLC rotate the servo motor a given number of rotations?	02/21	2/23/20	it can run a given number of rotations	P	
Can the PLC measure actuator speed?	02/21			F	
Can the PLC adjust the actuator speed?	02/21			F	
Can the origin limit switch send a signal to the PLC that it is depressed?					
Can the overtravel/end limit switch send a signal to the PLC that it is depressed?					

Design Validation Matrix

Project: 360 Designs
Last Updated: 2/26/2020

Project Budget & Cost

Future Issues + Risks

- Original scope was 2-3 modules
- 2-color anodizing timeline
- Difficulty getting PLC+HMI to work with encoder and motors
- Difficulty getting linear actuator to reset after each trial
- Hiding wires and making everything look professional